

CLAIMS

1. A refraction measuring instrument comprising:

measuring means that has a light source for emitting a measurement light beam to an eye to be examined and performs objective measurement on refraction of the eye to be examined based on reflection light of the measurement light beam emitted from the light source, which is reflected on the eye to be examined; and

an optical system for simultaneously guiding the measurement light beam emitted from the light source and visible light incident thereon from an outside to the eye to be examined,

wherein the measuring means measures the refraction of the eye to be examined while a subject is visually recognizing the outside through the visible light based on the reflection light of the measurement light beam which is guided to the eye to be examined through the optical system and reflected on the eye to be examined.

2. The refraction measuring instrument according to Claim 1 wherein the optical system comprises combining means for combining an optical axis of the measurement light beam with an optical axis of the visible light.

3. The refraction measuring instrument according to Claim 2 wherein the combining means comprises:

a free-form-surface prism having a surface for combining the optical axis of the measurement light beam with the optical axis of the visible light by reflection of the measurement light beam and transmission of the visible light; and

a deviation angle correcting prism for correcting a deviation angle of the visible light passing through the free-form-surface prism.

4. The refraction measuring instrument according to Claim 3 further comprising a wearing section for enabling the measuring means and the optical system to be worn on a head of the subject.

5. The refraction measuring instrument according to any one of Claims 1 to 4 wherein the measuring means further comprises separating means for separating an optical axis of the measurement light beam from the light source from an optical axis of the reflection light of the measurement light beam which is reflected on the eye to be examined.

6. The refraction measuring instrument according to any one of Claims 1 to 5 wherein the measuring means comprises:

mark projecting means for projecting the measurement light beam from the light source as a mark of a predetermined pattern to the eye to be examined;

imaging means for imaging the mark projected as the

predetermined pattern by the mark projecting means; and calculating means for calculating the refraction of the eye to be examined based on a shape of the mark imaged by the imaging means.

7. The refraction measuring instrument according to any one of Claims 1 to 6 further comprising:

eye movement measuring means for measuring eye movement of the eye to be examined;

driving means for driving the measuring means; and

control means for controlling the driving means to cause the measuring means to follow the eye to be examined based on a result of the eye movement measured by the eye movement measuring means.

8. The refraction measuring instrument according to Claim 7 wherein the eye movement measuring means comprises:

an irradiation light source for irradiating the eye to be examined with light;

detecting means for detecting an amount of light reflected from a predetermined region close to a limbus of the eye to be examined; and

calculating means for calculating a direction and/or a displacement of the eye movement of the eye to be examined based on the amount of light detected by the detecting means, and

the control means controls the driving means based on a

result calculated by the calculating means.

9. The refraction measuring instrument according to Claim 8 wherein the calculating means calculates a convergent angle of the eye to be examined based on the amount of light detected by the detecting means.

10. A refraction measuring instrument comprising a pair of right and left instruments, each of which is the refraction measuring instrument according to any one of Claims 1 to 9 to measure refraction of each of right and left eyes of the subject.